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CONTENTS

Title-page and Index, Volume 41 (1950) . . . . . i–viii

The Development of a Functional Course in Educational Psychology for Teachers 449
HERBERT KLAUSMEIER AND DONOVAN SWANSON

A Study of Teaching Potentialities 473
J. DAVID O'DEA

Technique for Evaluating the Ability of Teachers to Apply Principles Concerned with the Developmental Needs of Adolescent Girls . . 481
SARA ANN BROWN

The Use of Literal Grades 488
TRUMAN L. KELLEY

Mental Ability Ratings of Honor Students 493
LILLIAN G. PORTENIER

Book Reviews 500

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THE JOURNAL OF
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THE DEVELOPMENT OF A FUNCTIONAL COURSE IN EDUCATIONAL PSYCHOLOGY FOR TEACHERS[1]

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As Trow has pointed out in an earlier issue of this JOURNAL: "A visit to a school is still a saddening experience to an educational psychologist. With due respect to the many exceptions, so many things are wrong, so completely wrong, that the visitor wonders what has become of all the well-established 'principles' that the teachers and administrators supposedly learned in order to pass the psychology courses required for their certification."[2] He suggests that improvements can and should be made at the source; namely, in organizing and teaching the courses. The purpose of this paper is to present an account of a study to develop a functional course in educational psychology for teachers.

PRELIMINARY CONSIDERATIONS

Under the leadership of Professor Lucien B. Kinney, a comprehensive curriculum development and evaluation program in teacher education was begun in 1947 at Stanford University.

[1] Herbert J. Klausmeier and Donovan A. Swanson. *The Development of a Functional Course in Educational Psychology for Teachers.* Unpublished Ed.D. Dissertation, Stanford University, 1949. The writers are indebted to Professor Lucien B. Kinney, who served as chairman of the thesis committee.

[2] William C. Trow. "How Educational Psychology and Child Development Can Contribute to the Preparation of Teachers." *The Journal of Educational Psychology.* 39:129, March, 1948.

As part of this program, the role of educational psychology in the professional sequence was studied. The foundations for the study were laid in the spring quarter of 1948 when Professor Kinney taught the course and the authors were assistants in education. The evaluation was carried on during the autumn and winter quarters of 1948.

This study was directed to the organization and evaluation of a course in educational psychology designed for one quarter's work, carrying four quarter-hours of credit, required of all students seeking elementary- or secondary-school teaching credentials at Stanford University. The class population for the autumn quarter consisted of one hundred sixteen students; for the winter quarter, seventy-seven students. For both quarters approximately one-half had graduate standing; the remainder were undergraduates. All students had completed a course in general psychology; in addition, elementary-school candidates had completed a course in child psychology. In setting up the study the following major problems were defined and analyzed:

1) What are the competences of effective classroom teachers? An explicit definition of what constitutes teaching competence is essential in building a professional curriculum in teacher education. Unless the behaviors of effective teachers are operationally defined in terms of teaching competence, courses cannot be organized with any degree of validity, nor can the effectiveness of such courses be determined. The "Factors in Teaching Competence" as defined by the California Council on Teacher Education is a comprehensive statement of teaching competence upon which the professional program in teacher education at Stanford University is built.[3]

2) Which teacher competences should be developed in educational psychology as part of the professional sequence? The "Factors in Teaching Competence" provides the objectives to be developed in the total professional sequence. The responsibility of each of the various courses was assigned in staff conferences as the sequence of courses was established. In this manner, integration is provided for and duplications and omissions are avoided.

[3] Committee on Definition of Teaching Competence. California Council on Teacher Education. "Factors in Teaching Competence." Mimeograph statement. Stanford University, July, 1948.

3) In the pre-service education of teachers, what experiences should be provided in educational psychology to develop the competences? Learning experiences provided should: (a) utilize the unique contributions of the field of educational psychology to effective teaching and incorporate the objectives of the course, (b) be organized according to a developmental sequence which illustrates psychological principles of effective teaching, (c) be selected to illustrate the activities of the classroom teachers, and (d) utilize the resources of the public schools and the community.

4) How effective are the experiences in developing teacher competence? Evaluation is essential in curriculum development in order to determine (a) which competences are developed and to what extent, (b) which experiences are valuable in developing competences and to what extent, (c) which procedures are effective, and (d) what are the implications for practice and improvement.

Basic to this study was the assumption that teacher education is primarily an area of personnel development of which scholarship is one aspect. Thus, educational psychology is defined as an area of personnel development within the field of teacher education in which resources and procedures from general psychology, human biology, and cultural anthropology are brought to bear upon classroom problems. A second assumption was that "Factors in Teaching Competence" as defined by the California Council on Teacher Education represents a workable hypothesis on which to build a professional program in teacher education. Therefore, the objectives for educational psychology can be drawn from the "Factors in Teaching Competence" and defined operationally in terms of teaching competence.

To summarize, in setting up the program in educational psychology, this sequence was followed: (1) objectives in the course were established in terms of student behavior indicative of teaching competence; (2) learning experiences were tentatively organized to achieve the objectives; (3) sources of evidence to be used in observing the behaviors were identified; (4) evaluation instruments and procedures were developed for obtaining data; (5) the data were gathered, summarized, and interpreted to make the best possible judgment concerning student attainment of the objectives during the autumn quarter; (6) on the basis of the evaluation during the autumn quarter, certain

revisions were made in objectives, course experiences, and evaluation instruments; (7) data were gathered, summarized, and interpreted during the winter quarter; (8) on the basis of the evaluation, autumn and winter, conclusions were drawn and recommendations made.

DEFINING OBJECTIVES IN EDUCATIONAL PSYCHOLOGY

Agreement was reached that the primary responsibility of educational psychology is to develop the competence necessary for the prospective teacher to organize learning activities in the classroom in which the teacher:

1) Adapts psychological principles of learning to individuals and groups. (a) Provides for individual capacities of pupils. (b) Employs adequate motivational procedures. (c) Organizes learning experiences which possess meaning and structure for the pupil. (d) Uses effective practice procedures. (e) Selects and appraises experiences in terms of their transfer value.

2) Adapts psychological principles of growth and development to individuals and groups. (a) Interprets pupil behavior in relation to his present situation as shaped by past experience and as influenced by future expectations. (b) Adapts classroom experiences to the social backgrounds of the pupils. (c) Integrates classroom experiences with life in the home. (d) Integrates the social dynamics of the classroom. (e) Develops in the classroom an atmosphere conducive to mental health.

3) Adapts psychological principles of counseling and guidance to individuals and groups. (a) Knows each pupil as an individual. (b) Recognizes range of emotional maladjustments. (c) Provides success experiences for all pupils.

4) Adapts psychological principles of evaluation and measurement to individuals and groups. (a) Uses appropriate techniques for evaluating the effectiveness of school learning. (b) Uses appropriate techniques for measuring achievement. (c) Uses grading system with clearly defined purposes.

"Develops professional behavior" is a fifth major objective shared with all other professional courses.

After these general objectives had been agreed upon, specific aims for the course were developed. It was necessary that these aims be sufficiently complete and definite to orient the course experiences, to direct the selection of resources and materials,

and to serve as the basis for evaluation. The criteria for specific aims were adapted from those developed by Kinney.[4]

A. *Validity.*—Can the aims be justified on the bases of (1) social and professional needs of the students, (2) personal needs of the students, and (3) feasibility as determined by the possibility of attaining them?

The pioneer work of the California Council may be considered as having tentatively established the social and professional validity of these aims. Further validation has been obtained from the considerable body of research already carried out at Stanford University. While the personal needs of the students may be assumed to follow as a matter of course from the social and professional needs, the psychology of learning in general and of motivation in particular requires that the students accept the personal significance of the aims.

Another important question in regard to validation of an aim is whether it can be achieved with reasonable expenditure of time and effort. The answer here can only be tentative. Only through experience in teaching the course can the feasibility of an aim be finally established.

B. *Comprehensiveness and Selectivity.*—Do the aims include the outcomes of major importance and represent the unique contributions of the field, and differentiate the more important from the less important?

Comprehensiveness and selectivity of the aims was established on the basis of expert opinion and related research.

C. *Suitability of Form.*—The final consideration was to state the aims in a form which would be useful as a basis for teaching and evaluation. Expressing aims in terms of desired behavior has many advantages—it is simple, and it avoids verbalism, as well as the pitfalls of expressing outcomes in terms of traits. The criteria for form are:

1) Can I recognize this competence in a student?

2) Can I differentiate a student who has the competence from one who does not?

3) What kinds of behavior will distinguish the student who has the competence from one who does not have it?

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[4] Lucien B. Kinney. "Criteria for Aims in Mathematics." *The Mathematics Teacher.* 41:99–103, March, 1948.

To take an illustration: Most educators agree that an important aim in educational psychology is to develop prospective teachers who are competent to appraise the readiness of a pupil to learn a specific ability or concept. Stated operationally, the prospective teacher who is competent in this area demonstrates the following behaviors:

1) Understands the major factors which determine readiness to learn.

2) Recognizes how present interest may be used to motivate classroom learning.

3) Describes suitable diagnostic techniques for determining readiness to learn a particular ability or concept.

4) Evaluates diagnostic procedures used in the classroom.

5) Plans learning experiences which take into account factors of readiness.

This statement of operational definitions illustrates the extent to which one sub-section of aims under "Provides for individual capacities of pupils" was delimited and defined. It also indicates the kinds of experiences necessary to develop such competence and suggests areas in which student behavior may be observed and evaluated. Readings, group discussions, classroom visitations, films and resource personnel, and lectures all contribute to the development of these behaviors. Making an observational case study of a school child also contributes to competence in this area. The actual planning of learning experiences which take into account factors of readiness is suggested by the nature of the operational definitions.

DEVELOPING THE COURSE ORGANIZATION

The over-all pattern of the course comprised five major areas:

1) What contributions has educational psychology to successful teaching?

2) What is the typical sequence and pattern of meaningful learning?

3) What factors determine the social climate of the classroom? What is the significance of these factors for the teacher as an organizer of learning?

4) How may the teacher use the resources of the school to facilitate the adjustment of the individual child?

5) How may the teacher evaluate the effectiveness of his work?

The procedures employed in developing teaching competence as related to the first three major areas are illustrated below:

1. What contributions has educational psychology made to successful teaching? (a) What is the nature of the field? (b) What contributions do the authors of the textbooks claim for it? (c) With what kinds of classroom problems is educational psychology concerned? (d) What preparation do I as a teacher need in this field?

The purposes of this unit were: (a) to orient the student to the rôle of the teacher as an organizer of learning experience, (b) to provide a variety of motivational experiences for the major problems to be considered in this course, (c) to ensure student participation and acceptance of the objectives, and (d) to determine student interest and needs.

The students sought answers to the above problems in various activities. They scanned the textbooks. They visited classrooms in the public schools where they noted problems of organizing learning and problems of classroom control which require the use of principles of educational psychology. Information from these sources was brought together in small discussion groups which met each week during the quarter. In the first group meetings the students, on the basis of their experiences and with the guidance of the instructor, considered: (a) What topics should be dealt with in the course? (b) What outcomes sought? (c) How should the outcomes be evaluated?

From observations of public school classrooms the students derived a delineation of the scope and contributions of educational psychology to effective teaching practices. They observed that the organization of learning experiences is the central activity of the teacher; and it was in the rôle of organizing learning experiences that they, as prospective members of the profession, pictured themselves. Questions suggested for exploration and major consideration were included in the next unit.

2. What is the typical sequence and pattern of meaningful learning? (a) How may the teacher provide for individual capacities of pupils? (b) How may the teacher determine readiness to learn a particular ability or concept? (c) How are

children motivated to learn? 1) How may the teacher assist pupils to establish realistic goals? 2) What are the effects of rewards and punishments? 3) How is knowledge of progress assured? (d) How may the teacher organize learning experiences which possess meaning and structure for the pupils? (e) What are effective practice procedures? (f) How may the teacher secure transfer?

The common sequence in human learning involves a gradual transition from immature reactions to mature methods of responding and learning. During this period of development, the student, through active experience involving exploration, discovery, and verification, acquires meanings and generalizations which lead to competence. A review of procedures followed in teaching Topic II, "What is the Typical Pattern and Sequence of Meaningful Learning?" illustrates "the developmental sequence of learning."[5]

The major purpose of this topic was to develop the competence necessary for the prospective teacher to organize learning experiences in the classroom according to psychological principles of learning.

Step 1.—To achieve the above purpose, a variety of concrete experiences was provided. The teaching process was presented in a variety of settings with emphasis on the situation. A classroom visit was made in which the student observed a learning situation. A film was presented and discussed which illustrated typical classroom activities. Students read general and special methods books. Lectures were used to illustrate various teaching procedures. Class discussions were held centering on teaching practices in specific subject-matter areas. Resource speakers described teaching procedures in special fields. In small group meetings, students discussed procedures with which they were now familiar. Thus, the situations in which the concepts were experienced were simple, numerous, and varied so that the concepts remained the common elements. In the lectures and the group meetings the concepts acquired increasingly abstract meaning as opportunity was provided to differentiate out the common element. It was not considered sufficient to have the

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[5] Lucien B. Kinney. "The Operational Plan in the Classroom." *School and Society.* 28:145–149, September, 1948.

concepts explained in words. When this occurs, too often the result is a verbalism rather than a usable concept.

Step 2.—The concepts which had been acquired as a result of the numerous, varied experiences and had become increasingly abstract through differentiation were then manipulated on an abstract or symbolic level and relationships were explored. Opportunity to manipulate the acquired concepts was provided in class discussion. The lectures at this point were designed to help the students explore relationships by providing the necessary clues for the development of the group project.

The purpose of the group project was to provide a focus for the integration of concepts and understandings relative to how the pupil learns and how the teacher organizes learning experiences to facilitate the pupil's learning. In developing the learning unit, the students manipulated concepts and related them to a meaningful pattern. It was considered important that the pattern of concepts or generalizations should represent the students' own generalizations, discovered by them. The instructor planned the situation and provided clues; but the exploration, discovery, and verification represented the learning process of the student.

To illustrate the above further, the concept of the 'whole child' and the generalization, 'learning is purposeful,' are not to be memorized but are to be discovered in a variety of situations. The vocabulary of educational psychology must depend for adequacy and richness of meaning on the significance and variety of experiences that have contributed to the meaning. Competences to be developed through educational psychology are not to be memorized as verbalisms, but are to be developed as part of the individual student's behavior in meeting problem situations.

The necessity for concrete and numerous experiences is clear. It should be recognized, however, that the mere accumulation of experiences is of little value until they are organized. At the symbolic level the student is able to manipulate his concepts, classifying them by using one word or symbol to represent many items with a common characteristic, and relating them to other concepts and behaviors so as to form a part of a total pattern. Students, in developing the learning unit, related the procedures of teaching which they had seen, heard of, and read about, with

the planning of experiences for a particular classroom situation. The students thus carried over their understanding from old to new processes, and saw the place of the new in the old pattern.

Step 2 has for its purpose, then, the transfer of the students' attention from the situations in which the concept or process was being studied, to the concept or process itself, in order that it may be manipulated and understood in the context of the system of educational practice where it belongs. It then becomes a generalized and symbolized idea with which to interpret and control new situations.

Step 3.—Learning is not meaningful or useful unless the student can utilize in new situations what has been learned previously. The concepts, processes, and principles learned must be available in future teaching situations, the characteristics of which cannot be anticipated with exactness. The final step in the learning process, therefore, must be to identify if possible the utilization of the concept in new situations—to identify the characteristics of those situations in which it is appropriate.

In general we may think of this stage as one during which the newly defined process or concept is integrated with the professional work of the student. Left to itself this integration may or may not take place. 'Transfer of training' may occur by accident, but it is not part of good teaching to leave the final result to chance.

To ensure transfer and to develop planning competence, the group project involved the organizing of learning experiences suitable for a hypothetical, but typical, classroom situation. The development of the learning unit required that the students participate in a discussion group resembling a teachers' curriculum-planning committee. The integration of concepts and generalizations, acquired previously, as described in Steps 1 and 2, was accomplished in the final preparation of the written learning unit. Thus, in Step 3, generalized and organized procedures were carried back to significant problems.

The sequence of the learning process begins and ends in life situations. In between is a stage of abstraction, organization, and generalization. But, throughout, effective learning at the college level, as elsewhere, depends on the availability of many resources beyond the textbook and the lecture room—classrooms

for observing teachers in action, demonstrations of effective teaching, group discussions, dramatizations, resource personnel, children available for study, and other means by which the teacher education institution and public school system are brought in close relationship.

The teacher, while directing experiences in the classroom according to psychological principles of learning, becomes concerned with (a) the wide range of developmental patterns of behaviors present and (b) the kind of persons the pupils are becoming. These problems are dealt with in the next unit.

3. What factors determine the social climate of the classroom? What is the significance of these factors for the teacher as an organizer of learning? (1) What should the teacher know about growth, development, and behavior? (2) What should the teacher know about the individual child? (3) What should the teacher know about the child's family? (4) What are the dynamics of the peer culture? (5) What is the rôle of the teacher in the democratically constructive school? (6) What general principles concerning teacher behavior evolve?

The purposes of this unit were: (a) to define the social dynamics that operate both within and without the classroom which influence the course of effective learning, (b) to analyze the factors the teacher must deal with which determine the kind of person the pupil will develop into in the course of his learning, and (c) to achieve the outcomes operationally defined under the major objective—"Adapts psychological principles of growth and development to individuals and groups."

In addition to the experiences provided in the preceding topics, each student made an observational study of a child of school age in the community. The purpose of this study was to provide a focus for the organization and integration of the student's understanding of child behavior and development. The student observed the child's behavior in a variety of situations. He visited the home in an attempt to gain insight into the emotional stability of the home, the pattern of training, and parental expectations. All behavior observed was recorded in the form of anecdotes that described objectively (a) physical development and health status, (b) relationships with parents and siblings, (c) relationships with age mates, (d) school adjustment, and (e) interests and abilities. Then the student formulated a

series of hypotheses to account for the particular pattern of behavior and development which had been discovered. These hypotheses were checked against an organized framework of psychological principles. The student described kinds of information, not available, which he recognized as necessary to make a complete diagnosis. Finally, the student suggested a plan of action for helping the child if the data so warranted. The developmental sequence of learning was implemented in this unit with the study of an individual child serving similar purposes as those outlined for developing the learning unit.

EVALUATING OUTCOMES

The general plan of this study was that of professional curriculum development beginning with definition of objectives and concluding with appraisal of outcomes. The evaluation procedures incorporated those which were found effective by other researchers[6] and new methods were devised. As indicated previously, some of the experiences in the course were planned to develop theoretical understanding of a classroom problem; some to develop ability of the student to plan what he would do in this case; and some to develop ability to demonstrate effective behavior in meeting the situation. Therefore, competence of the students was appraised at three levels: theoretical, planning, and performance. Three paper-and-pencil tests were employed to determine competence at the theoretical level; three evaluation forms were constructed to appraise competence at the planning level; two forms were constructed to summarize performance behavior. A self-evaluation form and a student-opinion questionnaire complete the ten major instruments employed in the winter quarter. To determine change in behavior from beginning to end of each quarter, the results of a Principle and Judgment Test, an evaluation of first and last classroom observation report, and an analysis of observer comments and description of student behavior were employed.

Specific techniques utilized to determine the extent to which experiences in this course and not other courses had, for the major part, contributed to the development of the competences

[6] M. E. Troyer and C. R. Pace. *Evaluation in Teacher Education.* Washington: American Council on Teacher Education. 1944.

were: (1) staff meetings were conducted to define and delimit the objectives to be achieved in this course and other courses in the professional curriculum; (2) conferences were held with individual students from beginning to end of each quarter and data collected; (3) trained observers met with the students once per week and collected data from beginning to end of each quarter; (4) data were collected for two consecutive quarters with two groups of students, (5) tests and evaluation forms were administered at beginning and end of each quarter. A brief description of instruments, representative data on which conclusions were based, and comparisons of data for both quarters follow.

Paper-and-Pencil Test Results.—A Principles and Judgment Test was constructed and administered on the second and the last day of the quarter. The purpose of this test was to appraise student competence at a theoretical level with respect to attainment of two major objectives: "Adapts psychological principles of learning to individuals and groups," and "Adapts psychological principles of measurement and evaluation to individuals and groups." Also, the results were analyzed to ascertain change from beginning to end of quarter.

As indicated in Table 1, the mean score for the first administration was 38.31 with a standard deviation of 5.44 units and a range in score from 25 to 52. The mean score for the second administration was 47.31 with a standard deviation of 5.92 units and a range in score from 27 to 59. On the last administration, three scores were below the mean score of the first administration; in terms of standard deviation, the increase was slightly less than two. The critical ratio of the increase was found to be 9.48, which indicates that the difference was not due to chance.

The Case of Mickey Murphy,[7] a standardized instrument, was administered at the end of the quarter. The purpose of this test was to appraise competence at a theoretical level with respect to the other two major objectives: "Adapts psychological principles of growth and development to individuals and groups" and "Adapts psychological principles of counseling and guidance to individuals and groups." The data are summarized in Table 2.

[7] Warren R. Baller. *The Case of Mickey Murphy.* Lincoln: University of Nebraska, 1943.

The mean score for each of six objective-type parts of the test and the mean of the total score was computed for students with teaching experience and students with no teaching experience. The means were converted into percentile norms estab-

TABLE 1.—SCORES ON JUDGMENT AND PRINCIPLES TEST, FIRST AND SECOND ADMINISTRATION, WINTER QUARTER

First Administration		Second Administration	
Score	Frequency	Score	Frequency
		57–59	3
		54–56	6
51–53	1	51–53	11
48–50	1	48–50	23
45–47	5	45–47	10
42–44	17	42–44	7
39–41	12	39–41	9
36–38	16	36–38	1
33–35	10	33–35	1
30–32	7	30–32	0
27–29	2	27–29	1
24–26	2		
Number	73		72
Mean score	38.31		47.31
Standard dev.	5.44		5.92
σ of mean	0.64		0.70
Diff. of means			+9.00
σ of difference			0.95
Critical ratio			9.48
Reliability coefficient			0.74

lished by Baller. The range in percentile rank of mean score for sixty students with no teaching experience was from 62 to 91; the range in raw score was from 145 to 201. The range of percentile rank for twelve students with teaching experience was from 43 to 63; the range of raw score was from 131 to 213. The difference in total mean score between those with experience

and those with no experience was 2.83 units. A critical ratio of this difference was found to be 0.35 indicating that the difference was not significant. The mean score of the students with no teaching experience was higher by 4.03 units, winter than autumn. A critical ratio of 1.29 indicates that this difference is not significant, P. being 0.20.

TABLE 2.—MEAN SCORES FOR SIXTY STUDENTS WITH NO TEACHING EXPERIENCE AND TWELVE STUDENTS WITH TEACHING EXPERIENCE ON *Mickey Murphy*, WINTER QUARTER

	No Teaching Experience*			Experienced Teachers		
Test Part	Mean Score	Comparable Percentile Rank	Standard Deviation	Mean Score	Comparable Percentile Rank	Standard Deviation
II	19.33	87	3.12	18.67	59	3.62
III	8.22	78	0.98	8.17	55	0.90
V	51.25	91	7.20	50.75	63	11.74
VI	25.46	68	4.06	27.00	55	4.00
IX	47.75	77	6.51	46.00	50	9.00
X	22.55	62	5.38	20.75	43	6.06
Total	174.83		18.63	172.00		25.86

* The percentile norms defined by Baller are for undergraduate students with no teaching experience. In this study, thirty-nine students were undergraduates.

The data obtained through the Principles and Judgment Test and *Mickey Murphy* indicated that the students attained a relatively high degree of competence at the theoretical level with respect to the four major objectives defined for the course. The change from beginning to end of quarter was significant. Marked differences were found among individuals.

Planning Competence.—Behavior at the planning level was observed in written classroom observation reports, in written observational case studies, and in written group projects. Eleven learning units were developed in small group meetings. The

purpose of the learning unit was to develop planning competence related to two major objectives: "Adapts psychological principles of learning to individuals and groups" and "Adapts

TABLE 3.—RATING OF ELEVEN WRITTEN GROUP PROJECTS, WINTER QUARTER

Criteria for Rating	Frequency of Rating				Mean Rating
	4	3	2	1	
1) Plans experiences which utilize present interest to focus attention on subject matter.	8	3	0	0	3.73
2) Plans experiences which take into account factors of readiness.	8	2	1	0	3.64
3) Plans experiences which meet the needs of heterogeneous abilities and interests.	6	5	0	0	3.55
4) Plans a variety of experiences to motivate a particular learning.	7	3	1	0	3.55
5) Plans experiences which satisfy pupil needs.	6	4	1	0	3.45
6) Plans experiences which ensure transfer.	7	3	0	1	3.45
7) Plans experiences in which motivation is developed through positive interests.	7	2	1	1	3.36
8) Plans experiences which provide opportunity for successful participation of all pupils.	4	6	1	0	3.27
9) Plans experiences in which appropriate practice procedures are employed.	4	6	1	0	3.27
10) Plans experiences which provide an overview of the whole problem and its related parts.	6	1	4	0	3.18

psychological principles of measurement and evaluation to individuals and groups." The criteria employed in rating the units were ten operational definitions of the two objectives. Each of these criteria was rated on a 4, 3, 2, 1 scale. A 4 rating

was interpreted to indicate competence expected of effective classroom teaching, a rating of 3 to indicate competence expected of effective student teaching, a rating of 2 to indicate competence necessary to enter student teaching, and a 1 rating to indicate doubtful competence for student teaching. The results of the rating are summarized in Table 3.

The major purpose in developing the observational case study was to develop planning competence as outlined under the other two major objectives: "Adapts psychological principles of growth and development to individuals and groups" and "Adapts psychological principles of counseling and guidance to individuals and groups." The form developed for evaluating the case study included ten operational definitions as criteria; each rated on a 4, 3, 2, 1 scale as described for the learning unit. The results are summarized in Table 4.

The data thus obtained through evaluation of the learning unit and the observational case study indicated that the students developed a relatively high degree of planning competence with respect to the four major objectives defined for the course. Group performance as exhibited in the learning unit was superior to individual performance as indicated in the case studies. In comparing results for the two quarters, mean ratings were higher for the second quarter, but not significantly so. A wide range in planning competence was found.

Performance behavior.—Group meetings provided opportunity for observing student behavior in meeting actual problems involved in organizing the learning unit. Graduate students and teaching assistants in the School of Education observed the behavior of the students. The same criteria formulated for rating the written group projects were employed by the observers in evaluating the competence of each group's behavior. Individual members of each group were rated by the observers on a 4, 3, 2, 1 scale using as criteria six operational definitions of the fifth major objective, "Develops professional behavior." Each observer recorded the quality of individual student participation for each meeting in the following manner: a plus mark to indicate a positive contribution, a minus to indicate a delaying contribution, a question mark to indicate a question being asked, and a zero for an off-the-track comment. In addition, anecdotal information was recorded concerning individual and total group

TABLE 4.—RATING OF SEVENTY-FIVE OBSERVATIONAL CASE STUDIES, WINTER QUARTER

Criteria for Rating	Frequency of Rating				Mean Rating
	4	3	2	1	
1) Evaluates the effect of the home on the behavior of the child.	41	26	6	2	3.41
2) Collects and records information concerning the child in objective anecdotes.	45	17	9	4	3.37
3) Demonstrates understanding of how growth factors influence the behavior of a particular child.	36	22	14	3	3.21
4) Demonstrates understanding of how school adjustment influences behavior of the child.	31	24	15	5	3.08
5) Plans practical ways of helping the child.*	16	15	6	4	3.05
6) Demonstrates understanding of how the teacher may use guidance files and anecdotal records to evaluate the adjustment of the child.	26	25	16	8	2.92
7) Recognizes how the teacher may help the child achieve satisfactory relationships with age mates.	26	22	20	7	2.89
8) Demonstrates understanding of interests and abilities which influence the behavior of the child.	23	29	13	10	2.86
9) Checks hypotheses against an organized framework of psychological principles.	24	22	18	11	2.79
10) Forms a series of hypotheses to account for a particular pattern of behavior.	23	20	20	12	2.72

* Thirty-four were not rated on this criterion because their data did not warrant a plan of remedial action.

behavior. During the autumn quarter ten observers participated in the study; in the winter quarter there were six.

The range of mean ratings assigned by ten group observers for the ten criteria listed in Table 3 was from 2.80 to 3.70, autumn quarter; in the winter quarter from 2.83 to 3.67. For the autumn quarter the number of students rated 4, 3, 2, 1 was 39, 37, 19 and 8 respectively; in the winter quarter, 19, 19, 7, and 0, respectively.

A summary of the participation record and a report of descriptive anecdotes in chronological order for two students, autumn quarter, illustrates the data on which individual ratings were based: Student A, assigned a 4 rating; this student was the group recorder once; the group chairman, three times.

Participation record summarized:

From nine to twenty-three positive contributions per meeting.
From two to five questions asked per meeting.
No off-track comments.
No delaying comments.

Descriptive statements:

Always conscious of what group is doing. Good at directing; volunteered an assignment at end of meeting. (First meeting.)
Read report to group; a positive contribution.
Showed excellent leadership:
"Let's do something more constructive."
"We're to consider the psychology; how we're going to put the material across."
Suggested assignment of definite tasks, extra meetings.
Went after film catalog.
Direct, practical, good organizer.
Has taken over chairmanship, is completely conscious of whole group situation, of each individual.
Organizes, allocates responsibilities, checks for performance.

Student D, assigned a 1 rating; this student served as recorder once; never as chairman.

Participation record summarized:

From three to eight positive contributions per meeting.
From one to three questions per meeting.
From one to four off-track comments per meeting.
From one to five delaying contributions per meeting.
Absent from one meeting; positive contributions decreased from beginning to end of quarter.

Descriptive comments:

Takes project lightly.
Amused over situation.
Doesn't listen to others.
Makes very few positive contributions
Appears uninterested.

The first part of one observer's summary of group progress illustrates change from beginning to end of quarter and indicates quality of performance:

"At the first meeting three or four students did most of the talking. The others listened or hesitantly submitted questions. The time was spent in setting up a learning situation for the study. The next meeting was characterized by greater participation by all members; they were still not discussing learning but were emphasizing the desired learning situations. By the third meeting, most of the members realized they had accomplished little in regard to understanding and explaining the learning process. This understanding could be attributed to numerous causes such as outside reading, subgroup discussions, possibly discussion with other groups, and casual conversation with each other. This awareness was noticeably present during the third meeting, along with a determination to do something about it. This insight added vigor toward solution of their problem. Small subgroups were set up for gathering information and organizing it around the earlier learning situation or framework. The chairman of each group reported on his section of the work, made the necessary revisions suggested by the group and finally inserted his contribution in with the remaining body of material making up the Group 2, Section 2, Learning Report."

The data collected by the observers indicated that the students demonstrated satisfactory competence in meeting actual problems. Other data obtained in individual conferences and in recorders' reports submitted after each group meeting substantiated this conclusion. A range of competence was found among the students in meeting actual situations and in exercising professional behaviors.

Student opinion and self-evaluation.—Conclusions reported thus far have been based upon data obtained from objective-type tests, rating scales, and anecdotal information. In the ques-

tionnaire and self-evaluation form, students expressed their opinions concerning the course and estimated their own competence. These instruments were developed and administered to summarize in quantitative form (1) the effectiveness of motivation, (2) the degree of student acceptance of the objectives, (3) student opinion of course experiences, and (4) student self-rating.

The questionnaire consisted of two parts, the first containing fifteen questions concerning course activities and objectives, the second containing six questions relating to weaknesses and strengths of the course. In Part I, all students expressed the opinion that the course had been valuable in increasing their competence as teachers and in developing their understanding of the rôle of the teacher as an organizer of learning experiences. There were no negative responses to these items. Ninety-seven per cent felt that the course had increased their understanding of how children learn and of the rôle of the teacher in counseling and guidance. Ninety-four per cent felt that the course had made other educational experiences more meaningful. Ninety-two per cent indicated that the course had increased their understanding of child growth and development. Concerning specific course activities—lectures, classroom observations, learning unit, case study, and class discussions—six to eighteen per cent expressed the opinion that these had not contributed to achieving the purpose intended. Ninety-six per cent indicated that the course would not have been more valuable as a 'straight' lecture course. Understanding of psychological theory applied to the classroom was increased for ninety-four per cent. For twenty and fifteen per cent, respectively, the course did not open any new fields of interest nor was the course organization meaningful.

In Part II of the questionnaire, students listed all major activities as strengths of the course; all major activities were also listed at least once as weaknesses of the course. For improving the course, students listed more time for developing the various activities and also suggested increasing the unit credit from four to eight quarter-hours. Suggestions were made for improving all aspects of the course including selection of text materials. The data in Part II supported that obtained in Part I; the majority accepted the activities as valuable in achieving the objectives; for a minority one or more activities were not considered of value.

TABLE 5.—STUDENT RATING OF OWN COMPETENCE, WINTER QUARTER

Criteria for Rating	Frequency of Rating				Mean Rating
	4	3	2	1	
1) Evaluates the effect of the home on behavior of the child.	37	23	6	0	3.47
2) Understands use of guidance files and anecdotal records to evaluate adjustment of child.	33	25	8	0	3.38
3) Plans learning experiences which utilize present interest to focus attention on subject matter.	34	25	6	2	3.36
4) Collects and records information concerning pupil behavior in objective anecdotes.	31	27	8	0	3.35
5) Understands how growth factors influence the behavior of a particular child.	30	25	10	1	3.27
6) Plans learning experiences in which motivation is developed through positive interest.	22	30	14	0	3.12
7) Plans learning experiences which provide opportunity for successful participation of all pupils.	25	25	14	2	3.11
8) Plans practical ways for helping the child.	21	31	12	1	3.11
9) Understands the implications of social class training for the teacher.	26	25	10	5	3.09
10) Plans a variety of experiences to motivate a particular learning.	21	29	14	2	3.05
11) Understands conditions necessary for maintaining group morale in the classroom.	17	34	13	2	3.00
12) Plans experiences which take into account factors of readiness.	16	35	15	1	2.98
13) Plans experiences which provide an overview of the whole problem and its related parts.	23	23	13	6	2.97

TABLE 5.—(*Continued*)

Criteria for Rating	Frequency of Rating				Mean Rating
	4	3	2	1	
14) Forms a series of hypotheses to account for a particular pattern of behavior.	16	35	12	3	2.97
15) Recognizes how the teacher may help the child achieve satisfactory relationships with age mates.	17	31	13	5	2.91
16) Plans learning experiences which satisfy pupil needs.	15	30	21	1	2.88
17) Understands how the teacher may use standardized test results to evaluate the status of an individual child.	18	25	20	3	2.88
18) Participates in defining instructional objectives and in curriculum planning.	18	26	17	6	2.84
19) Plans experiences which ensure transfer.	14	31	16	5	2.82
20) Plans experiences which meet the needs of heterogeneous abilities and interests.	10	35	18	4	2.76

On a self-evaluation form, students rated themselves on a 4, 3, 2, 1 scale using as criteria for rating twenty operational definitions of the four major objectives. Nine of these criteria were identical to those employed in evaluating the learning unit; seven were identical to those used in rating the observational case studies. The results of this rating are summarized in Table 5.

Students in appraising own competence demonstrated a range both with respect to a particular criterion and different criteria. The general pattern was similar to that obtained in other evaluative instruments. On the criteria identical to those for the group learning unit, mean ratings were lower in the self-evaluation than for the group ratings. On criteria identical to those for the case study, the range of mean ratings on the self-appraisal was from 2.88 to 3.47; the mean ratings assigned to the written studies ranged from 2.72 to 3.41.

SUMMARY

A course in educational psychology for teachers was organized with objectives defined as teaching behaviors which behaviors were drawn from "Factors in Teaching Competence." Course experiences were organized to achieve the objectives, and evaluation procedures were devised to determine the extent to which the teacher competences were developed. The data collected and analyzed for two consecutive quarters with two groups of students indicate that:

1) The objectives as defined and delimited for the last quarter were psychologically valid.

2) The course experiences as organized and presented were effective in developing teaching competences as defined in this study.

3) The over-all strategy was effective in achieving the objectives.

4) At three levels—theoretical, planning, and performance—the majority of students exhibited a high level of competence. A small minority did not demonstrate growth or satisfactory competence at any level and were recommended as doubtful candidates for the teaching profession. Because of the paucity of data relative to pre-service standards, the conclusions in terms of 'high' and 'unsatisfactory' were necessarily tentative. It is recommended that the students be followed in their student-teaching and later teaching positions. The final criterion upon which the effectiveness of this or any professional course can be determined must be the quality of pupil growth developed in the teacher's classroom.

A STUDY OF TEACHING POTENTIALITIES*

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This study is in the general field of the measurement of a set of characteristics objectively regarded as symptomatic of an aptitude for the teaching profession.

First will be presented the importance of this and similar studies. Secondly, a brief treatment of the early testing movement in the selection of teacher candidates will be given. Finally, a feasible procedure will be offered which will assist in the selection of teacher candidates.

IMPORTANCE OF STUDY

The research of Dr. Ray C. Maul[9] in the field of supply and demand of teachers has pointed to a need for additional studies. In reference to his educational research, Dr. Maul writes, "It is designed to help the public gain a fuller understanding of a problem in which the public has a vital stake, namely the improvement of schools in which the children of today must be prepared to meet the unpredictable problems of tomorrow."

To relieve this vexing problem the teaching profession must labor in the partnership with the farmers, ministers, merchants, and others engaged in helping children to become better adults. Obviously, the people needed to meet the present demand should possess qualities or traits of competent teachers.

RELATED STUDIES

The professional schools for training teachers have limited means for ascertaining in advance whether a candidate has or can acquire those qualities possessed by successful teachers. The measurement of teaching efficiency has engaged the attention of research workers for several years. Meriam,[8] in 1906, is credited as being the first who attempted to use objective measures of qualities related to teaching efficiency. This first attempt in removing the measurement of teaching efficiency and aptitude

* For their constructive criticism, appreciation is extended to Ralph Evans, Head of the Department of Education, Fresno State College and to W. M. Ehrsam, Director of Guidance, Wichita University.

from the field of opinion to that of objective measurement was followed by numerous attempts. Because of one or many reasons these attempts had only limited success.

Ruediger and Strayer[11] in 1910 constructed a device to measure characteristics of teachers as related to efficiency in teaching. This attempt did not prove highly successful. In 1912, Elliot and Boyce[5,4] devised score cards for the measurement of teaching efficiency. The score cards for rating teachers were marked by the teacher's supervisors. These authors concluded that the reports were too high, due to a halo effect of the ratings on the score cards.

TABLE I.—AVERAGE CORRELATION OF SUPERVISORS' RANKINGS AND THE LISTED MEASURED CHARACTERISTICS

Quality or Trait	r
Scholarship	+.600
Intelligence	+.560
Professional Study in Service	+.393
Salary	+.352
Total Teaching Experience	+.172
Scores on a Professional Test	+.147

Knight[6] made an objective study on general teaching ability. His method was to obtain ratings of teachers by both supervisors and the teachers' associates in teaching upon general professional ability. Each judge ranked the teachers whom he knew in order of merit. These rankings were then transmuted into numerical units representing the composite judgment of each group of judges. Against this criterion he correlated the measurements made upon a number of traits which could be measured objectively. The average correlations found for high school teachers are shown in Table I.

Knight applied the same method used for high school teachers to the study of the elementary school teachers. Two of his results should be noted: first, a correlation of +.541 between teaching efficiency of elementary school teachers and a professional test; and second, a correlation of +.108 between teaching efficiency and scores on an intelligence test.[3] Knight concluded that a professional test is highly predictive of teaching

efficiency for elementary school teachers, but he suggests that an intelligence test may be more desirable for prediction on the secondary level.*

In 1923, Somers[12] obtained ratings of teachers in their first year of experience. He used a score card and correlated against this criterion scores in intelligence tests, school marks, participation in extra-curricular activities and personality estimates. The most significant correlation co-efficients are shown in Table II.

TABLE II.—CORRELATION OF TEACHERS' RATING IN THEIR FIRST YEAR EXPERIENCE AND LISTED CRITERIA

Factors Used	r
Normal School Success	+.73
Two Years' Marks in School	+.71
Teaching in Training School	+.70
Personality Estimates	+.62
First Semester Normal School Work	+.60
Intelligence Tests	+.43
Extracurricular Activities	+.41
Class "Cuts" in Normal Schools	+.53

A study by Whitney[13] followed a similar technique used by Somers. The correlations between the criteria and teaching success as measured by supervisors are as follows:

TABLE III.—CORRELATION OF TEACHERS' RATING IN THEIR FIRST YEAR EXPERIENCE AND THE LISTED CRITERIA

Factors Used	r
Intelligence	+.025
Secondary School Marks	+.091
Marks in Academic Subjects in Normal School	+.073
Marks in Professional Subjects in Normal School	+.143
Practice Teaching in Normal School	+.238
Physique	+.124

Knight, Ruch, Telford, and Bathurst[7] have published a set of professional tests for elementary school teachers. These aptitude

* Dr. C. W. Boardman has written an excellent condensation of Knight's study. His research, reference,[3] was particularly helpful to this study.

tests were the first for which a measure of validity was obtained. The authors obtained a correlation co-efficient of +.378 using the test scores and the merit of ranking of the teachers by supervisors.

Corresponding to Knight's study is the George Washington University Series, prepared by F. A. Moss, T. Hunt, and F. C. Wallace in the coöperation with various educators.[10]

The progress in the field of teacher aptitude tests is illustrated by Bingham.[2]

> "The professional schools for training teachers have as yet found no sure means of ascertaining in advance whether a candidate has or can acquire the traits described in the foregoing paragraphs, although marked defects and shortcomings are usually recognizable during an interview with an applicant for admission. His intellectual grasp and mental alertness can be fairly well estimated by references to his previous school record and his performance in tests of scholastic aptitude, vocabulary, English usage, mathematics, and other academic subjects, supplemented when necessary by specially devised tests of intelligence such as the Coxe-Orleans Prognosis Test of Teaching Ability."

The Coxe-Orleans Test is a device to measure the ability to learn the subject matter taught in school. The five parts of the test measure the candidate's general information, knowledge of teaching methods and practices as acquired from his observation as a student, ability to learn the type of material included in professional reading matter, and ability to study and work out educational problems.

The co-efficients of correlation between test scores and achievement at the end of the first college year range between .53 and .84.

It is noted that, although the authors have demonstrated the value of this test for predicting school achievement, the extent to which it is prognostic of actual teaching ability has not been ascertained.

A recent reference pertaining to the measurement and prediction of teaching efficiency is a monograph by Barr[1] and others. The monograph, "The Measurement and Prediction of Teaching Efficiency: A Summary of Investigations," supplies data on the validity and reliability of some 72 tests, rating scales and inventories frequently used in this area.

SELECTION OF THE MEASURED CHARACTERISTICS

A test to measure the characteristics listed in Table IV was constructed under the direction of Dr. H. E. Schrammel, Director of the Bureau of Measurements, Kansas State Teachers College, Emporia.

Studies indicate that personality and intelligence are highly significant factors for measuring teaching aptitudes. Knight found these factors significant to teaching efficiency in high school. These two basic traits were not measured in this study.

Table IV lists the set of characteristics that were selected for measurements.

TABLE IV.—CHARACTERISTICS MEASURED IN THIS STUDY

Test	Form	No. of Questions
1. Interest	Multiple Response	15
2. General Knowledge	" "	45
3. (a) Procedures in Teaching	" "	20
(b) Teaching Information & Judgment	True—False	67
4. Prof. Reading Comp.	" — "	25
Total		172

TRYOUT OF TEST

The control group in this study consisted of teachers. The teachers coöperating in the study were probably a select group of professionally minded teachers who would tend to rank above the average of the school teaching population. They were elementary, high school, and college teachers all of whom were members of the faculty at the Kansas State Teachers College, Emporia.

The second group consisted of college students. This group was broken down into various categories as indicated in Table V.

In summary, nearly three hundred tests were given. The time required to take the test averaged about fifty minutes.

SUMMARY OF STATISTICAL DATA

The majority of the statistical measures were computed from the test results obtained from the administration of the test at

the Kansas State Teachers College. The basic data are shown in Table V. Additional data computed from the basic data are listed in Table VI.

TABLE V.—COMPARISON OF VARIOUS STATISTICAL MEASURES

	Control	All of the Experimental Group	Non-teaching Group	Experimental Group, going to Teach
Median	147.1	126.6	120.3	127.3
Mean	146.9	125.0	119	127.2
Standard Deviation	5.9	13.7	13.5	12.2
Sigma Mean	1.07	1.00	1.82	1.05
Number of Cases	30	189	57	132

Read Table thus: The median for the control group was 147.1; for the entire group, 126.6.

TABLE VI.—COMPARISON OF FURTHER STATISTICAL MEASURES

	Difference	Sigma Difference	Difference / Sigma Difference (Critical Ratio)	Number of Chances in 100 of True Difference
All of the Experimental Group	21.9	1.46	15.0	100
Non-teaching Group	27.6	2.10	13.1	100
Experimental Group Going To Teach	19.7	1.50	13.1	100

Read Table thus: The difference between the control group true mean and all the experimental group true mean was 21.9.

Comparison of the mean scores shows that the control group made a higher score than did either of the experimental divisions. The mean score for the control group was 146.9 and that of the total experimental group, 125.0.

The data listed in Table VI deal with the reliability of the difference between the mean scores of the control group and the

experimental groups. It will be noted that because these differences are large and the sigma differences are small, the data yield a statistically significant ratio. In other words, there are 100 chances in 100 that the differences possess statistical significance.

By correlating the odd and even scores of the test a reliability co-efficient of .77 was obtained. The P. E. was $\pm .009$. By correlating the combined scores of Parts I and II with Parts III and IV, Table IV, a reliability co-efficient of .88 was obtained. The P. E. was $\pm .007$.

SUMMARY AND CONCLUSION

This study attempted to isolate a set of measurable characteristics indicative of teaching success. The test used to measure the characteristics indicates that the control group possessed the measured traits to a higher degree than those of the other group. In general, those preparing for teaching score higher than those preparing for some other vocation. This finding is vitally significant to the study.

It is found that a good teacher need not score high in one singled out characteristic. However, a good teacher should possess in total a high degree of knowledge, intellect, interest, professional reading comprehension, and teaching procedures.

Personality has long been held to be a large factor in teaching success. Past studies have indicated that such traits as self-control and patience are essentials to teaching success.

It is the opinion of the author that the following procedures will provide some indications necessary in attempting to evaluate those traits indicative of teaching potentialities. These factors are: (a) the student's attitude regarding further education and his like or dislike of previous educational experiences. This involves the student's previous school success. (b) The student's personality should be investigated. This includes mental ability, emotional pattern, and the work habits of the student. (c) Finally, careful consideration of the measured characteristics as listed in Table IV is statistically significant in the selection of potential teacher candidates.

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TECHNIQUE FOR EVALUATING THE ABILITY OF TEACHERS TO APPLY PRINCIPLES CONCERNED WITH THE DEVELOPMENTAL NEEDS OF ADOLESCENT GIRLS*

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The purpose of this study was to develop a technique for evaluating the ability of secondary-school teachers to apply the principles concerned with the developmental needs of adolescent girls. The first hypothesis was that pencil-and-paper tests would be developed which would measure the ability of teachers to recognize and apply principles concerned with human growth and development of adolescents. Two tests were developed to measure this ability: Test A, Recognition of Principles; and Test B, The Case of Jacqueline Croner, essay and short-answer forms. The second hypothesis was that one case study would be sufficient to measure this ability.

The assumption was that it is important for all teachers to be able to apply principles concerned with the developmental needs of children. The experimental group in the study was composed of home economics teachers at the secondary level, on the further assumption that instruments which were valid and reliable for that group would be equally useful for all secondary-school teachers.

Test A, Recognition of Principles, was made up of sixty-two principles which related to the needs of adolescents in three major aspects of development: physiological, social, and integrative. A jury of four judges assisted in the selection of the principles and agreed unanimously on the key for the short-answer test.

Test A was revised after having been administered to a preliminary group of thirty-five home economics teachers in West Virginia to discover any lack of clarity in vocabulary and statement, any difficulties in administration, and to determine the length of time required to give the test.

Test B, The Case of Jacqueline Croner, was designed to meas-

* Abstract of Doctoral thesis submitted to Graduate Faculty, Iowa State College, 1949.

ure the ability which teachers have to apply principles in interpreting data concerned with the developmental needs of adolescents, and to select educational means for helping pupils with their problems. The test was a description of an adolescent based on data from a cumulative record of a high-school girl. A short-answer form which used responses furnished by a preliminary group of home economics teachers was set up. These responses were in the form of statements and were evaluated for their clarity and conciseness. The test was administered to the same preliminary group as the one which reacted to Test A. Revisions based on the results from the preliminary group were made. The revised test which contained one hundred ten items was administered to a jury of six judges, and from their responses the key for scoring was determined.

The trial group to whom the tests were administered was made up of eighty-eight home economics teachers in West Virginia who had signified a willingness to participate. Several factors were considered in selecting these teachers: marital status, recency of graduate study, length of teaching experience, and the feasibility of visits by the writer.

Test B, The Case of Jacqueline Croner, essay form, was sent to each of the participants. This was followed by Test B, short-answer form; and Test A, Recognition of Principles.

The reliability of Test A was determined by obtaining the correlation coefficient between scores on split halves. A Pearsonian coefficient of correlation was obtained, .7305, and corrected for double length by the Spearman-Brown modified formula. This correction yielded a coefficient of reliability of $.848 \pm .030$. Since testmakers cite a relationship of .90 as very high this reliability is considered very satisfactory.

The reliability of Test B, short-answer form, was determined by the same method and when the correlation of .8379 was corrected for double length, it was found to be $.913 \pm .018$, a result which would indicate a very dependable reliability.

Two methods for establishing validity of the instrument were employed. One was the correlating of scores on Test A and on Test B, essay form, as well as the scores on Test A and Test B, short-answer form. The coefficients obtained were:

Test A and Test B, essay	$.9554 \pm .009$
Test A and Test B, short-answer	$.9758 \pm .005$
Test B, short-answer, and Test B, essay	$.9363 \pm .013$

In order to have greater confidence in the results, coöperation from another group of ninety home economics teachers in West Virginia, who had not participated in the first group, was requested. The procedure except for visits and interviews was duplicated and the coefficients of correlation were again obtained.

The results for the second group were:

Test A and Test B, essay	.9506 ± .010
Test A and Test B, short-answer	.9557 ± .009
Test B, short-answer and Test B, essay	.9247 ± .015

These results would seem to indicate that the high correlations of the first group were not due to sampling, since the differences in the correlations are slight.

A second method of validation which was used, was to compute coefficients of correlation between the performance on the instruments with a criterion assumed to be valid. In this study that criterion was the scores obtained on interviews which the writer had with the teacher, the principal and/or the superintendent, and the score on a one-day observation of the teacher, designated as an interview-observation score. Records of these interviews and observations with the group of eighty-eight teachers were kept by the writer, and these were scored by a jury of five judges. When coefficients of correlation were computed between the scores on the tests and the interview-observation scores, the correlations were:

Test A and interview-observation scores	.8748
Test B, essay form and interview-observation scores	.9013
Test B, short-answer and interview-observation scores	.9113

Since Test B was designed to measure the ability of the teacher to diagnose problems and select remedial measures, coefficients of correlation to determine whether one section of the test was more valid than the other were computed. The correlations between the diagnostic sections on the two tests—Test B, essay and Test B, short-answer form—was .7880 ± .040. The correlation between the scores on the two remedial sections was .4327 ± .087. Also computed were coefficients of correlation between the scores on the remedial section of the short-answer form of Test B and the interview-observation scores; the result was a coefficient correlation of .7866 ± .041.

The items on both Test A and Test B were analyzed to deter-

mine internal consistency and to discover items which should be discarded or revised because they were not discriminating. The eighty-eight papers were divided into two groups: the upper group was composed of the fifty per cent who received the highest scores; the lower group of the fifty per cent who received the lowest scores. The percentage of correct responses for each item was determined for each group. The items were then analyzed to determine (1) those for which each group had the same percentage of correct responses; (2) those for which the lower group had a higher percentage of correct responses; and (3) those for which the difference in percentage between the two groups was less than 10. All except thirteen of the sixty-two items in Test A, and thirty items of the one hundred ten in Test B, were satisfactorily discriminating.

In a teacher-education program it would be valuable if devices which could be administered easily were available, so that a prediction of what a teacher would do relative to the application of principles when he is faced with a real-life situation could be made. In the present study paper-and-pencil tests which have high correlations of validity and which can be used as the independent variables in computing regression equations have been developed. For the criterion, the interview-observation score, which was used as the dependent variable in determining regression, the validity was assumed.

If a relationship exists between two distributions it becomes possible to predict values in one distribution from known values in the other. Regression lines are developed for the purpose of estimating values of one variable from known values of another variable within the limits of the data which are available.

In the following discussion of regression, the scores on the two tests and the interviews and observations will be designated by these symbols:

X_1 = Test A: Recognition of Principles Test
X_2 = Test B: The Case of Jacqueline Croner (short-answer form)
X_3 = Test B: The Case of Jacqueline Croner (essay form)
Y_1 = Interview-observation.

There were three main problems to be considered in analyzing the regression data. The first problem was: Can a regression equation which will predict teacher behavior in a real-life situa-

tion with reasonable accuracy be determined? The second problem was: How accurate would the prediction be if only the short answer tests, X_1 and X_2 were used? The third problem was: To what degree have all factors determining teacher behavior relative to applying principles concerned with adolescent development in a real-life situation been measured by the regression equation?

The interview-observation score was obtained from information relative to how the teacher applied principles concerned with the developmental needs of adolescent girls in a real-life situation. It was determined by the use of a scale which had a range of 1 to 15.

The first problem was to set up regression equations. The equations using all three variables is:

$$Y = -6.0096 - .2235X_1 + .2556X_3 + .2517X_2$$

The equation using two variables is:

$$Y = .0741X_1 + .2644X_2 - 5.9562$$

The equation using one variable is:

$$Y = 2140X_1 + 1.9382$$

To ascertain the usefulness of these equations it was necessary to determine the multiple coefficients obtained when all variables were used or progressively dropped; to determine the standard partial regression correlations holding various ones of the variables constant, and to make tests which indicate the significance of regression coefficients.

The multiple correlation coefficient obtained between all the estimated Y values and the actual values was .9366. This correlation for the three pencil-and-paper tests combine is sufficiently high to give reasonable confidence in prediction of the ability of teachers in this area.

The multiple R^2 is .8773. This correlation means that 87.73 per cent of the variability among teachers in their ability to apply principles in this area can be measured by the three pencil-and-paper tests.

If in Test B, X_3 is omitted from the multiple correlation, R^2 becomes .8394. Thus the difference between the multiple R^2 based on three independent variables and the multiple R^2 based on two independent variables is .0424. If one independent

variable is dropped from the equation an additional 4.24 per cent of the variability remains unaccounted for by regression.

The standard partial regression coefficient specifies changes in Y, independent of the changes in the other independent variables and is the best measure of which variable is the most important in predicting Y. The b' for each of the three tests is:

$$X_1 = .9139$$
$$X_2 = 1.1492$$
$$X_3 = .6984$$

It is obvious that X_2 is the most important test in predicting Y, since the standard partial coefficient for it is the highest of the three tests.

Standard partial regression coefficients may also be used to judge which of the independent variables are most important in estimating Y. If X_2 is held constant and X_1 is compared with Y, the correlation is low—.0160. If X_3 is held constant and X_1 is compared with Y the correlation is low—.1071.

If X_1 is held constant the correlations between X_2 and Y, and between X_3 and Y are:

$$r_{Y2\cdot1} = .5449$$
$$r_{Y3\cdot1} = .4577$$

When X_3 is held constant the correlations between X_1 and Y, between X_2 and Y, and between X_1 and X_2 are:

$$r_{Y1\cdot3} = .1071$$
$$r_{Y2\cdot3} = .4431$$
$$r_{12\cdot3} = .7840$$

When X_1 is held constant, the correlation between X_3 and X_2 is:

$$r_{32\cdot1} = .0619$$

When each independent variable is compared with Y, the other two variables being held constant, the following correlations are obtained.

$$r_{Y1\cdot23} = .4318$$
$$r_{Y2\cdot13} = .5818$$
$$r_{Y3\cdot12} = .5495$$

Since all t tests coefficients—4.385, 5.385 and 6.559—are highly significant, each of the independent variables may be

assumed to be related to the dependent variables in a linear manner. All three also contribute to the total regression, and for the most accurate prediction relative to the ability of teachers to apply principles in this area, all three variables should be measured.

The extremely high value of multiple R^2—.8773—is evident of the success with which individual predictions may be made when the three independent variables selected in this study are used.

Throughout the statistical analysis, X_3, the essay form of Test B, The Case of Jacqueline Croner, has proved to be the least valuable of the variables to use for prediction purposes. It has the smallest standard partial regression coefficient, the smallest partial correlation with the Y variable, and the smallest t value. It seems, therefore, that it is justifiable to drop it from the regression equation, and lose a very small part of the total predictable information in favor of more easily administered and time-saving tests.

The recommended regression equation obtained is:

$$Y = -.0741X_1 + .2644X_2 - 5.9562$$

This Y variable may be predicted for individuals by measuring the X_1 and X_2 variables, a task which would take considerable time, since approximately one and three-fourths hours are required for each individual to read the two tests, and additional time is necessary to score it.

It can be reasonably assumed that the ability of individuals to apply principles can be measured by the use of X_1 and X_2. These tests should make it unnecessary for teacher-educators to expend time, energy and money in visiting widely distributed schools for the purpose of observing teachers in their classrooms and, during extra-curricular activities, of interviewing them and consulting their administrators.

THE USE OF LITERAL GRADES

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A system of rating, or classifying, students by means of letters A, B, C, etc., or E (excellent), G (good), etc., is called a literal grading system. It commonly gives an order of merit of groups, with no very precise quantitative relationships between the literal grades.

The distaste of the statistician for literal grades is fully justified on two counts: Generally but few classes are employed so that there is a large grouping error and as the literal grades provide an ordered series only the quantitative relationships between the classes is unknown. We here propose literal grades which shall have these shortcomings to as small a degree as possible. A solution is possible if the form of distribution of the trait being graded is known.

We shall assume a normal distribution of talent, arguing that the abilities, pressures and interests that bring students into classes tend to produce a homogeneous group, that is, a group that does have a modal ability-pressure-interest characteristic and frequency falling off from this mode in both directions in a somewhat normal manner.

For notation we use the following: The class given the literal grade A is the highest ranking class, the next highest class has literal grade B, etc. The A class is the tail of a normal distribution. Assuming a unit normal distribution its mean is $\bar{A}$, its tempered class index (described later) is A, its upper limit is infinity and its lower limit which is at the boundary between classes A and B is x_{AB}, its ordinate at the lower boundary is z_{AB}, the number of cases in the class is q_A, which is identical with q_{AB} the proportion to the right of the point x_{AB}, the variance of the measures in class A from the class mean $\bar{A}$ is V'_A, and finally the mean squared deviation of the measures in this class from the tempered class index, A, is here called the class variance and is labelled V_A. For class B we have notation

$\bar{B}$ = class mean
B = tempered class index

x_{AB} = upper class limit
x_{BC} = lower class limit
z_{AB} = ordinate at the upper limit
z_{BC} = ordinate at the lower limit
$q_B = q_{BC} - q_{AB}$ = proportion of cases in the class
V'_B = variance from $\bar{B}$
V_B = variance from B

Of course we use similar notation for all other classes.

Except for a two-class system, A and B, or a three-class system A, B, and C, it is impossible to have class means such that all differences between neighboring means are equal. However it is almost universal to assume that the A pupils are as superior to the B pupils as the B pupils are superior to the C pupils, etc. Since $\bar{A}$, $\bar{B}$, $\bar{C}$, $\bar{D}$, etc. do not show equal differences we modify, or temper, the scale employing indexes A, B, C, D, etc. upon which has been imposed the condition $A - B = B - C = C - D$, etc. This is the first imposition that we make. The second is that the class limits shall be so chosen that the variance error of estimate due to grouping

$$V_{est} = q_A V_A + q_B V_B + q_C V_C + \text{etc.}$$

shall be minimal.

Even when those in a class, say B, are correctly assigned to the class there are errors when all are given the same mark B, for in ability they range all the way from x_{BC} to x_{AB}. The variance of the measures from B is the variance error due to grouping for those graded B. This is not the total variance error of estimate, which is equal to the variance due to grouping plus the variance due to misjudgment which has placed individuals in wrong classes. We here only attempt to minimize the error due to grouping.

We shall not linger over the two category case for it is surely axiomatic that to minimize the grouping error the proportion in the A class should be .50 and the proportion in the B class also be .50.

It is obvious in the three category case that the proportion in the A class must be the same as that in the C class, so class means $\bar{A}$, $\bar{B}$, and $\bar{C}$ must be equally spaced and thus constitute the tempered class indexes A, B, and C. Utilizing formulas [8:26] and [8:29] of Kelley's *Fundamentals of Statistics*, 1947, we obtain

$$V_A = V_C = 1 + \frac{x_{AB}z_{AB}}{q_A} - \left(\frac{z_{AB}}{q_A}\right)^2$$

$$V_B = 1 - \frac{2x_{AB}z_{AB}}{1 - 2q_{AB}}$$

Weighting these three variances by the respective proportions involved we obtain the function which we desire to minimize. The minimum occurs when $z_{AB} = 2q_A x_{AB}$. It is interesting to note that this is the same condition as that which gives the necessary upper and lower tail portions of a normal distribution to maximize the critical ratio of the difference between means of tail portions over its standard error (see Kelley, *Fundamentals of*

TABLE I.—THREE OPTIMAL CLASSES FOR A BASIC UNIT NORMAL DISTRIBUTION (0 = 1.00)

Class	Class Limits		Proportions in Classes	Actual Class Means	Tempered Class Indexes	Intra-class Variance from Class Means
	Lower $x =$	Upper $x =$				
A	.61200	∞	.27027	1.2240064	1.2240064	.25090
B	−.61200	.61200	.45946	.0000000	.0000000	.11873
C	−∞	−.61200	.27027	−1.2240064	−1.2240064	.25090
	Weighted intra-class variance					.19017
	Standard error of measurement due to grouping					.43609

Statistics, Ch. VIII, Sec. 8). At this point $q_A = .27027$ and $x_{AB} = .61200$. Table I herewith is given to facilitate comparison with later tables for 4, 5, and 6 category classifications.

The number of decimal places in the tables which follow is, for most purposes, excessive. They have been reported to this large number of places for two reasons. In the case of Table II, and the lower limit of class *A*, it was necessary to compute a large number of decimal places to establish, indubitably, that the class limit was not exactly one standard deviation from the mean. In all tables, to secure proportions correct to three or four places many additional places were necessary in the class

limits. Any one desiring to check the writer's work, or to proceed further with this sort of determination, will need the eight-decimal place values of x as given.

The determination of the proportions entering into the optimal four-class system was accomplished by cut-and-try methods. The outcome is given in Table II. This is easy to remember because x_{AB} is almost exactly one standard deviation.

TABLE II.—FOUR OPTIMAL CLASSES FOR A BASIC UNIT NORMAL DISTRIBUTION (0 = 1.00)

Class	Class limits		Proportions in Classes	Actual Class Means	Tempered Class Indexes	Intra-Class Variance from Tempered Class Indexes
	Lower x =	Upper x =				
A	.99960851	∞	.15875	1.52482177	1.46400843	.202842
B	.00000000	.99960851	.34125	.45971231	.48800279	.080393
C	−.99960851	.00000000	.34125	−.45971231	−.48800279	.080393
D	−∞	−.99960851	.15875	−1.52482177	−1.46400843	.202842
	Weighted intra-class variance					.119271
	Standard error of measurement due to grouping					.345356

Using the same laborious methods solutions have been obtained for five-class and six-class systems. The results are shown in Tables III and IV.

Our general conclusion is that there can be an improvement in literal grading systems if the proportions in the classes are well chosen. The well chosen proportions, if the trait is normally distributed, are given for three-, four-, five- and six-class systems in Tables I, II, III and IV.

TABLE III.—FIVE OPTIMAL CLASSES

Class	Class limits		Proportions in Classes	Actual Class Means	Tempered Class Indexes	Intra-Class Variances from Tempered Class Indexes
	Lower $x =$	Upper $x =$				
A	1.26575727	∞	.1028	1.74187247	1.66317989	.176861
B	.42450165	1.26575727	.2328	.79684081	.83158994	.057438
C	−.42450165	.42450165	.3288	.00000000	.00000000	.058637
D	−1.26575727	−.42450165	.2328	−.79684081	−.83158994	.057438
E	−∞	−1.26575727	.1028	−1.74187247	−1.66317989	.176861
	Weighted intra-class variance					.082385
	Standard error of measurement due to grouping					.287028

TABLE IV.—SIX OPTIMAL CLASSES

Class	Class limits		Proportions in Classes	Actual Class Means	Tempered Class Indexes	Intra-Class Variances from Tempered Class Indexes
	Lower $x =$	Upper $x =$				
A	1.46105627	∞	.072	1.90562097	1.80680381	.162593
B	.73884685	1.46105627	.158	1.05343905	1.08408228	.042380
C	.00000000	.73884685	.270	.35294148	.36136076	.044579
D	−.73884685	.00000000	.270	−.35294148	−.36136076	.044579
E	−1.46105627	−.73884685	.158	−1.05343905	−1.08408228	.042380
F	−∞	−1.46105627	.072	−1.90562097	−1.80680381	.162593
	Weighted intra-class variance					.060878
	Standard error of measurement due to grouping					.246735

MENTAL ABILITY RATINGS OF HONOR STUDENTS

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Do all honor students earn superior ratings on tests of mental ability? What is the range of mental ability scores for students upon whom a given honor has been conferred? How widely do mean mental test scores vary for students receiving different honors? To answer these and other questions, data were compiled for students who were the recipients of awards and/or who were elected to various professional and honorary fraternities at the University of Wyoming during the twenty year period from 1929 to 1949.

In common with most institutions of higher learning the University of Wyoming attempts to promote interest in, and to grant recognition for, outstanding work in the different lines of activity by election to various collegiate honorary societies, and by conferring awards, prizes and scholarships. Printed programs listing the honorary elections and awards are distributed at the 'Honors' assembly held annually during the latter part of May. Copies of the twenty programs from 1929–1949 furnished a complete list of the honorary elections and award recipients for the period.

Since the Ohio State University Psychological Examination has been administered to freshmen at the University annually, beginning with the fall quarter 1929, scores were available in the personnel files for most of the honor students. Successive forms of the O. S. U. Test from Form 14 to Form 23 were used during the twenty years. To secure comparable scores for students who had taken different forms of the test, percentile ratings based on freshmen norms were used. The mean and range of the percentile ratings for students receiving each of the honors listed are shown in Table I. A study of these data reveals many significant facts. First, there is a very wide range in percentile ratings for the recipients of most awards, in a few cases from the lowest to the highest decile. For the Phi Beta Kappa awards only were all the percentile ratings in the upper quartile. The mean percentile ratings for the recipients of awards from the honorary fraternities are higher than the mean ratings for

TABLE I.—RANGE AND MEAN OF PERCENTILE RATINGS ON THE O. S. U. TEST FOR STUDENTS RECEIVING PROFESSIONAL AND HONORARY FRATERNITY AWARDS AT THE UNIVERSITY OF WYOMING, 1929–1949*

Organization	Number	Range	Mean
Alpha Epsilon Delta			
Outstanding premedical freshman	8	69–99	87.4
Alpha Kappa Psi			
Outstanding junior (male) in Commerce	10	40–99	78.6
Alpha Zeta			
Agriculture freshman with highest scholastic ave.	14	9–93	59.1
American Society Mechanical Engineers			
Outstanding work in Student Branch A. S. M. E.	12	13–95	63.0
Gamma Sigma Epsilon			
Highest ranking first-year chemistry student	20	8–100	80.8
History Club			
Highest ranking freshman in history	18	37–100	84.4
Kappa Delta Pi			
Educ. fresh. and soph. with highest scholastic ave.	40	20–100	84.9
Phi Beta Kappa			
Graduating senior with highest scholastic ave.	16	76–100	90.3
Phi Kappa Phi			
Outstanding freshman, sophomore and junior	59	9–100	89.5
Phi Gamma Nu			
Woman major in Commerce with highest scholastic ave.	16	26–100	84.5
Phi Sigma Iota			
Outstanding freshman in French and in Spanish	36	28–100	84.2
Phi Upsilon Omicron			
Highest ranking freshman in Home Economics	20	61–99	82.4

TABLE I.—(*Continued*)

Organization	Number	Range	Mean
Pi Delta Epsilon			
Outstanding first year Branding Iron reporter	15	46–100	78.7
Psi Chi			
Undergraduate showing promise in psychology	9	71–98	88.6
Sigma Tau			
Outstanding freshman in Engineering	9	12–98	81.0
Theta Alpha Phi			
Outstanding actor and actress in the Univ. Theatre	40	29–99	76.2

* Many of the above fraternities have been installed at Wyoming since 1929, and some awards were not conferred annually. Most of the awards were made for at least ten years although O. S. U. scores were not available for all recipients.

recipients of awards from professional organizations. Phi Beta Kappa (90.3) has the highest mean rating followed closely by Phi Kappa Phi (89.5). The lowest mean ratings were found for Alpha Zeta (59.1) which confers its award on the freshman earning the highest scholastic average in the College of Agriculture, and for the American Society of Mechanical Engineers (63.0) which recognizes outstanding work in the Student Branch of the Society. The mean ratings for all other groups fall in the upper quartile, and with but two exceptions, Alpha Kappa Psi (78.6) and Pi Delta Epsilon (78.7), in the second highest decile.

Most of the O. S. U. tests were administered to the students during the last semester of their senior year in high school or as entering freshmen at the University. In many instances the students did not realize the significance of the tests, and consequently their scores may not be reliable measures of the abilities tested. This fact probably accounts for most of the low ratings listed under the percentile range. However, many studies indicate that the O. S. U. Test, as well as most other tests designed as tests of general intelligence for college students, measure the abilities required for courses in the Liberal Arts and Sciences more successfully than they measure the abilities stressed in Agri-

culture and Engineering courses. (See reference[5].) This fact is verified not only by the relatively low mean percentile ratings for the recipients of the Alpha Zeta and A. S. M. E., awards but likewise by the mean ratings for the students elected to the three major honor societies: Phi Beta Kappa, Phi Kappa Phi, and Sigma Xi, as disclosed in Table II.

TABLE II.—RANGE, MEAN, STANDARD DEVIATION, AND CRITICAL RATIO OF PERCENTILE RATINGS ON O. S. U. TEST FOR STUDENTS ELECTED TO HONORARY ORGANIZATIONS AT THE UNIVERSITY OF WYOMING, 1929–1949

Organization	Number	Range	Mean	SD	CR
Phi Beta Kappa Outstanding scholarship in Liberal Arts and Sciences	56	28–100	92.32	12.85	3.88
Phi Kappa Phi Outstanding scholarship in any college	247	25–100	84.28	18.05	4.00
Sigma Xi Special aptitude for scientific research in pure and applied science	78	10–100	71.73	25.85	6.06

The mean percentile rating for Phi Beta Kappa (92.32), which limits its membership to outstanding scholars with their major course work in the Liberal Arts and Sciences, is eight points above the mean for Phi Kappa Phi (84.28), which elects outstanding scholars from any college, and twenty points higher than for Sigma Xi (71.73), which bases its recognition on special aptitude for scientific research in both pure and applied science. At Wyoming many students are elected to Sigma Xi from the Colleges of Agriculture and Engineering. The differences between the means are significant for all three groups as indicated by critical ratios of 3.88, 4.00 and 6.06, respectively.

The variability in the distribution of the percentile ratings is smallest in the Phi Beta Kappa group, S. D. 12.85. Only five (nine per cent) of the fifty-six Phi Beta Kappa students had percentile ratings below 75 and only one student below 60. The variability is far more pronounced for the Phi Kappa Phi group as shown by a SD of 18.05, and even more so for the Sigma Xi group with a SD of 25.85. More than twenty-five per cent of the students elected to Phi Kappa Phi and fifty per cent of those elected to Sigma Xi had percentile ratings below 75, while seven and twenty per cent, respectively, were below 50.

Failure of the O. S. U. Test to measure the abilities recognized in awarding honors in the College of Agriculture and in some departments in Engineering is further indicated in the data on department honor books awarded to outstanding students in the various departments as shown in Table III. Of the mean percentile ratings definitely below 75, that is below the upper quartile, four are for departments in the College of Agriculture; Agronomy (49.1), Animal Production (49.0), Home Economics (60.2), and Veterinary Science (53.6) and the remainder in Mechanical Engineering (54.5), Law (65.7), Military Science (66.9), and Physical Education for men (48.0) and women (61.8). The five highest ratings: Economics and Sociology (93.8), Chemistry (92.2), English (91.2), Greek and Latin (90.6), and Zoloogy (89.8); are for departments in the College of Liberal Arts and Sciences. It should be observed that all of these ratings are in or very near the highest ten percentile.

It is also of interest to note that the mean percentile rating for students receiving the Gamma Sigma Epsilon award (80.8 first-year chemistry) is much lower than for the upper classmen receiving the department honor book in Chemistry (92.2), while the reverse is true for the Alpha Zeta award (59.1-agriculture freshmen) and the recipients of the honor books in Agriculture (about 49) and also for the Phi Upsilon Omicron award (82.4-home economics freshmen) and the recipients of the Home Economics department honor book (60.2). Thus, it seems that the predictive value of psychological tests for determining students who may win honors varies not only with the departments but also with the particular honor conferred by the department.

Although many students may earn high percentile ratings on psychological tests, only a very limited number of them receive

TABLE III.—RANGE AND MEAN OF PERCENTILE RATINGS ON O. S. U. TEST FOR STUDENTS ON WHOM DEPARTMENT HONOR BOOKS WERE CONFERRED

Department	Number	Range	Mean
Agronomy	15	20–85	49.1
Animal Production	16	7–90	49.0
Botany	17	59–99	82.0
Chemistry	18	80–100	92.2
Commerce	19	62–100	81.5
Economics and Sociology	16	80–100	93.8
Education			
Elementary	17	15–98	74.6
Secondary	19	28–100	75.9
Engineering			
Civil	18	24–100	82.7
Electrical	16	24–99	74.2
Mechanical	17	34–92	54.5
English	18	66–100	91.2
Geology	15	41–96	75.3
Greek and Latin	10	72–100	90.6
History	17	29–100	85.0
Home Economics	19	30–90	60.2
Law	15	11–96	65.7
Mathematics	17	39–100	82.1
Military Science	16	8–98	66.9
Modern Languages	18	28–100	81.2
Music	20	6–100	72.4
Physical Education			
Men	17	7–95	48.0
Women	19	11–98	61.8
Physics	17	6–100	77.5
Political Science	19	17–100	74.4
Philosophy and Psychology	20	23–100	85.3
Veterinary Science	15	8–100	53.6
Zoology	19	80–99	89.8

honors. This is due in part to the comparatively small number of honors awarded, but even more, perhaps, to the fact that many able students concentrate their efforts on extra-curricular activities at the expense of grades, while others are handicapped in their study by emotional difficulties and various other personality maladjustments. For many students, winning honors is a form of adjustment.

It would seem then that while there is a positive correlation between psychological test ratings and honor awards the honor recipients are not limited to students with high psychological test scores, and that many students who make high test scores fail to win honors. The percentile ratings of students winning a given honor from year to year and also for students winning different honors in various departments vary widely, in some instances even from the lowest to the highest decile.

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BOOK REVIEWS

CARNEY LANDIS AND M. MARJORIE BOLLES. *Textbook of Abnormal Psychology*. New York: The Macmillan Company, 1950, pp. 634.

The greatest problem of modern civilization today is not atomic energy or biological warfare but is in the field of human relationships. This is one of the two fundamental ideas that the authors of this revised text in abnormal psychology have kept in mind in selecting and organizing the materials for the revised edition. The other is that the book written by them five years ago is outdated as a result of the vast amount of research that has been done in knowledge areas that are basic to understanding abnormal behavior. Their wish is, therefore, to write a revised edition that incorporates this research and also helps to enlighten the reader so that he gets a sense of the significance of human relationships out of it as well as learning the facts concerning abnormal behavior from it. Adding modern research contributions, of course, necessarily makes it possible for them to eliminate material less in line with modern tendencies. The general pattern, however, is similar in nature to that found in the first edition. The materials are presented in five sections called Orientation, Varieties of Abnormality, Explanations, Psychopathology, and Diagnosis and Therapy. Wherever possible in presenting a problem or a general topic they describe the facts known about the problem, explanations for these findings, and the psychology or psychopathology behind it. Each chapter is followed by references for further reading. The book contains a fairly comprehensive glossary and an index as well as a listing of acknowledgements of many quotations, figures, and tables used.

The kind of material that used to compose a full-sized book in abnormal psychology is here included in one section called "Psychopathology." Treated here are all the disorders of behavior: sensation, perception, action, emotions, volition, impairment of intellect, aphasia and amnesia. The section on "Varieties of Abnormality" includes the usual listing, but gives much more attention to facts recorded in recent literature about physical illness, physical handicaps, and personality adjustments of people with physical handicaps. The section on "Explanations"

includes a discussion of heredity and environment, development, internal environment, and the brain. The chapter on "Psychotherapy" includes a brief consideration of the most frequently used projective techniques. The section on "Diagnosis and Therapy" includes chapters on the law, psychotherapy, educational guidance and counseling, and mental hygiene.

The chapter on "Culture and Environment" is relatively adequate and includes a consideration of psychopathology in different cultures; national, racial, and religious groups; war and economic depression; education; economic status, rural and urban rates. For some reason there are some omissions of well-known ecological studies of behavior. The viewpoint in this volume as in the first is eclectic and a conscious attempt is made to build up in the reader and the student who will use it as a text a respect for facts and figures to weight evidence with and also conscious is the attempt to be open-minded but preserve the skepticism of the scientist.

The differences between psychosis and neurosis are dealt with in line with modern knowledge; namely, that people who are neurotic more chronically are not the kind of people who get psychoses. Alcoholics Anonymous is given a relatively uncritical treatment here as in many other books recently written. Psychoanalysis, hypnoanalysis, and narcoanalysis are considered by the authors as methods of getting around the resistance of the person so he relates material which cannot readily be brought to consciousness. Group therapy, the method of the AA, is considered as forms of supportive therapy.

All in all, this is a very comprehensive text incorporating materials and contributions from recent developments of both the biological and social sciences with due emphasis to research findings. The material is all relatively well organized for teaching purposes and there is enough here to begin the consideration of other problems that are not treated at length. There is enough here to serve the purpose of an adequate course in abnormal psychology or psychopathology. Generally speaking, the people who have liked the first volume for teaching purposes will find this volume at least as good and in many respects better.

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ROY M. DORCUS AND MARGARET HUBBARD JONES. *Handbook of Employee Selection.* New York: McGraw-Hill Book Co., 1950, pp. 349. $4.50.

The literature on employee selection is extensive but the quality of publications shows wide variability. In an effort to bring together minimal information on studies reporting results of selection methods the compilers of this volume examined over twenty-one hundred references. To be included in the final list of four hundred twenty-six references abstracted a report had to meet five criteria: the type of employee specified; the number of subjects given; tests used named or described; the criterion of job proficiency explicitly stated; and the actual (quantitative) results obtained reported. It is an interesting commentary on research in this field that barely one-fifth of the reports examined could meet these minimal criteria.

For each study in the final collection the abstract includes the bibliographic reference, the number and description of subjects, tests used, the job proficiency criteria, the validity data (percentages, correlation, distribution, etc.), and, where given, data on reliability. The entries are arranged chronologically and include studies between 1906 and 1949. There are indexes by job, test, and author. The job index lists two hundred eleven different jobs including teacher (with fifty abstracts), school principal, library assistant, and dean of women.

This volume should prove useful for personnel administrators and for vocational counselors.

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STANLEY D. PORTEUS. *The Porteus Maze Test and Intelligence.* Palo Alto, Calif.: Pacific Books, 1950, pp. 194.

Over a generation, psychological testers have passed from dependence upon a few tests, chief among them the Binet, to the active use of a large number of tools each of which has special merit for some purposes. Among the latter is the Porteus Maze Test. Porteus' new volume assembles his knowledge, experiences, and reflections relating to the Maze Test. The book is more than a manual for the test, although it includes instructions for testing, scoring guides, and similar clinical helps.

Porteus discusses use of the test in clinical diagnosis, and the

implications of changes in performance following lobotomy. He presents a qualitative score which has been found to differentiate delinquents from control groups. Both of these will have interest for some practicing psychologists, although it appears that the test is best treated as an opportunity for observing the subject rather than by any objective scoring of the product. Two chapters on differences among racial groups collect much material previously published in scattered sources, and express the author's view that such differences on the Maze reflect constitutional factors.

The book is most of all a personal history, recounting the long period when Porteus' contributions were, in his opinion, overshadowed by the Stanford-Binet. This retelling of our tribal conflicts is not without interest, but Porteus' anecdotes, quotations from early sources, and retracing of the path by which we have modified our interpretation of the Binet test seem lacking in present-day relevance. His advocacy of the Maze Test as a clinical tool is well-warranted, but he seems to distinguish inadequately between what the Maze measures and 'planning' as a general trait. The strongly-felt opinions Porteus drops are in turn intriguing and stimulating, amusing, and outrageous. The book is a lively memento of a psychological pioneer.

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J. E. WALLACE WALLIN. *Children with Mental and Physical Handicaps.* New York: Prentice-Hall, Inc., 1949, pp. 549.

Specialists in the field of handicapped children will recognize in Dr. Wallin's new volume, *Children with Mental and Physical Handicaps*, an amplification of his earlier volume on the education of handicapped children. Forty years of first-hand experience as director, supervisor, and instructor in the fields of education and treatment of handicapped children has made it possible for the author to write knowingly. In twenty-one chapters he covers most phases of the field with the emphasis on diagnosis and treatment. Although the book is not divided into divisions the chapters group themselves in three large divisions; namely, (1) Definition of concepts, (2) Classification problems, (3) Consideration of special types. Classifications are treated in terms of psychological characteristics, educability and socio-vocational

competency, etiology, and special clinical types. Types considered include cretinism, mongolism, growth anomalies related to endocrine disturbances, anomalies related to metabolic disturbances, epileptic seizures in children, encephalitis, the orthopedically disabled: cerebral palsy, poliomyelitis, microcephaly, hydrocephalus, syphilitic brain defects. Of the thirty-four illustrations included, few are new, some will easily be recognized as having appeared in earlier volumes.

On page 20 of the book, in consideration of the Wechsler-Bellevue classification distribution, the span between 70–80 is omitted. As in his previous writing of this nature the author in this volume is thorough in his descriptions, critical in his attitudes, and insistent on concise definition. And being an old-timer it is understandable that he refers to his earlier writings to prove that what is now being said he has already said. He not only is extremely critical of behavioristic style of environmentalism but is particularly critical of Bernardine G. Schmidt's study *Changes in Personal, Social, and Intellectual Behavior of Children Originally Classified as Feebleminded.* In the light of the facts presented by him he is justified in this criticism. His portrayal of types, while adequate for educational purposes, is not always for psychotherapeutic purposes; but the book was not intended to do everything. For consideration of personality problems with greater emphasis on sociological and cultural orientation the reader can search elsewhere. However, for a critical presentation of biological and psychological facts considered this is an excellent volume for specialists in the field.

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something like uniformity of style, footnotes and bibliographical references frequently require considerable 'marking for the printer,' and this is difficult—if not impossible—where matter is single-spaced.

Manuscripts should not be marked for style—this is done in the editorial office. In the matter of style the JOURNAL has certain set rules and also some marked preferences. For example, no boldface type is used; the use of italics is restricted to titles of books and periodicals, foreign words, and subheads. As to preferences, in both references and bibliographies the JOURNAL prefers 'John Brown' to 'Brown, John.' Footnotes and bibliographical references are set as paragraphs with the first line indented and the following lines flush, rather than the first line flush and the subsequent lines indented.

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1
2
3
4
5
6
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15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
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